REMARKS

Claims 1-23 are pending. Claims 1, 13 and 18 are amended to address informalities therein. Marked-up copies of the claims showing the changes made by this Amendment are set forth in the Appendix attached hereto. No new matter is submitted. Accordingly, entry of this amendment is respectfully requested.

In item 1 of the Office Action, claims 1-11 are objected to for lack of a period at the end of claim 1. Claim 1 has been amended to include a period at the end thereof. Claims 2-11 depend from claim 1. Accordingly, the objection to claims 1-11 having been obviated by the amendment to claim 1, withdrawal of the objection to claims 1-11 is respectfully requested.

In item 3 of the Office Action, claims 1-5 and 9 are rejected under 35 U.S.C. 102(b) as allegedly anticipated by Haschberger, et al (US Patent No. 6,147,762) (hereafter "Haschberger"). The rejection is respectfully traversed.

To maintain a rejection under 35 U.S.C. 102(b) a reference must teach each and every feature of a claim. Glaverbel v. Northlake, 45 F.3d 1550 (Fed. Cir. 1995). Haschberger does not do so.

Applicant's invention with respect to claim 1 comprises, *inter alia*, obtaining coefficients b_i where S = 0 in order to identify non-linearities in a measured interferogram. To obtain the coefficients bi, specific equations are used as recited in claim 1 whereby:

$$I_m = a_1 I + a_2 I^2 + a_3 I^3 + \ldots;$$

$$S_m = a_1 S + a_2(S*S) + a_3(S*S*S) + b_3\,(S*S*S*S) + \ldots;$$

$$I\ =\ b_1 I_m + b_2 I_m^{\ 2} + b_3 I_m^{\ 3} + \ldots\ ;\ \text{and}$$

$$S = b_1S_1 + b_2S_2 + b_3S_3 + \dots .$$

Applicant's invention, as recited in claim 1, uses non-linear distortions (I_m), a measured spectrum (S_m), a linear interferogram (I), and a linear spectrum (S) to obtain the coefficients b_i that help to identify and correct non-linearities according to the invention. Such is considerably different than the algorithm approach used by Haschberger to correct non-linearities, whereby coefficients a_i are used to determine the characteristic features of a distortion-free interferogram (Col. 3, lines 53-56). Further, the corrected interferogram of Haschberger requires a proportionality factor c (Col. 4, lines 54 – 65) that Applicant's invention does not require.

Thus, Haschberger fails to teach each and every element of the claimed invention with respect to claim 1. Accordingly, as claims 2-11 depend directly from claim 1, withdrawal of the 35 U.S.C. 102 (b) rejection of claims 1-5 and 9 based on Haschberger is respectfully requested.

In item 5 of the Office Action, claims 6-8 and 10-23 are rejected under 35 U.S.C. 103(a) as allegedly obvious in view of Haschberger. The rejection is respectfully traversed.

Applicant's invention with respect to claim 1 is discussed above. Haschberger, likewise, is discussed above. The various detectors represented by U.S. Patent Nos. 5,377,003, 5,811,059, 6,455,851, 5,581,085, 6,466,961 and 6,731,961 in combination with Haschberger fail to overcome the deficiencies of Haschberger at least with respect to the method of obtaining coefficients b_i as recited in claim 1, from which claims 6-8, 10 and 11 directly depend. As discussed above with respect to claim 1, the algorithm approach of determining and correcting non-linearities disclosed in Haschberger is considerably different than the equations used to determine and correct non-linearities as recited in claims 1 and 12 of the invention. Nor is there any suggestion or motivation in Haschberger alone, or in combination with the remaining applied references identified above, to determine or correct non-linearities using the equations of claims

1 and 12 of the invention. Thus, withdrawal of the 35 U.S.C. 103(a) rejection of claims 6-8, 10 and 11 based on Haschberger is respectfully requested.

With respect to claim 12, Applicant's invention comprises a Fourier transform spectrometer including, *inter alia*, a signal processing means for acquiring interferogram data wherein the measured interferogram is represented as a measured spectrum $S_m = a_1S + a_2(S*S) + a_3(S*S*S) + b_3\ (S*S*S*S) + \ldots$ wherein S is the spectrum of the linear interferogram and * indicates convolution, a linear interferogram I is expressed as a power series of a measured interferogram Im as in $I = b_1I_m + b_2I_m^{\ 2} + b_3I_m^{\ 3} + \ldots$, the linear spectrum is expressed as a power series of the spectra of the interferogram powers $S = b_1S_1 + b_2S_2 + b_3S_3 + \ldots$, and the coefficients b_i are computed where $S = 0$ using the I_m, S_m, I and S equations identified herein. The coefficients b_i computed, as recited in claim 12, help to identify and correct non-linearities according to the invention. As discussed above with respect to claim 1, such is considerably different than the algorithm approach used by Haschberger to correct non-linearities, whereby coefficients a_i are used to determine the characteristic features of a distortion-free interferogram (Col. 3, lines 53-56). Further, the corrected interferogram of Haschberger requires a proportionality factor c (Col. 4, lines 54 – 65) that Applicant's invention does not require. Nothing in Haschberger alone, or in combination with any of the other applied references identified above, teach or suggest the combination of features recited in claim 12 for determining or correcting non-linearities.

As conceded in the Office Action, the reference electromagnetic radiation source and detector recited in claim 12 are nowhere explicitly disclosed in Haschberger. Further, the various detectors represented by U.S. Patent Nos. 5,377,003, 5,811,059, 6,455,851, 5,581,085, 6,466,961 and 6,731,961 in combination with Haschberger fails to overcome the deficiencies of Haschberger at least with respect to the method of obtaining coefficients b_i as recited in claim 12 and from which claims 13-23 directly or indirectly depend. Thus, withdrawal of the 35 U.S.C. 103(a) rejection of claims 12-23 based on Haschberger is respectfully requested.

As none of the references applied teach or suggest the combination of features recited in independent claims 1 and 12, from which all remaining claims directly or indirectly depend, Applicant asserts that the invention recited in claims 1-23 is patentably distinguishable. Accordingly, all objections and/or rejections having been obviated by the amendment and remarks made herein, allowance of claims 1-23 is respectfully solicited.

Should the Examiner determine that anything further is desirable to place this application in even better form for allowance, the Examiner is invited to contact the undersigned at the telephone number indicated below.

Respectfully submitted,

Dermott J. Cooke
USPTO Reg. No.: 41,685

Scully, Scott, Murphy & Presser
400 Garden City Plaza - Ste. 300
Garden City, New York 11530
Telephone: (516) 742-4343

DJC:jam

Appendix:

Marked-up copies of the claims showing the changes made by this Amendment are set forth below:

1. (currently amended) A method of acquiring interferogram data in a Fourier transform spectrometer, the spectometer including a detector that provides an output signal that exhibits non-linear distortion in a measured interferogram represented by a power series $I_m = a_1 I + a_2 I^2 + a_3 I^3 + \ldots$, comprising [the steps of]:

   representing a measured spectrum $S_m = a_1 S + a_2(S*S) + a_3(S*S*S) + b_3 (S*S*S*S) + \ldots$ wherein S is the spectrum of the linear interferogram and * indicates convolution;

   expressing a linear interferogram I as a power series of a measured interferogram I_m as in $I = b_1 I_m + b_2 I_m^{\ 2} + b_3 I_m^{\ 3} + \ldots$;

   expressing the linear spectrum as a power series of the spectra of the interferogram powers $S = b_1 S_1 + b_2 S_2 + b_3 S_3 + \ldots$;

   measuring the non-linear effects of the detector from one or more resolution elements in spectral regions known to have no energy; and

   obtaining the coefficients b_i where $S = 0$ by applying the measured non-linear effects to $S = b_1 S^1 + b_2 S^2 + b_3 S^3 + \ldots$.

2. (original) The method of claim 1 wherein:

   a set of m measurements from 1 to n + 1 is selected from the spectra of the powers of the measured interferogram where S = 0; and

   making $b_1 = 1$ and m = n.

3. (original) The method of claim 1 wherein:

   a set of m measurements from 1 to n + 1 is selected from the spectra of the powers of the measured interferogram where S = 0;

   m > n;

and the least square approximation is used to find b_i.

4. (original) The method of claim 1 wherein:

for each measurement of the measured spectra the average of 2 or more resolution elements in the spectra of the powers of the measured interferogram is used to compute b_i.

5. (original) The method of claim 1 wherein:

the measured interferogram is collected by an AC signal channel and a DC offset is taken from the measured interferogram collected by a DC coupled signal channel.

6. (original) The method of claim 1 wherein:

the detector is a single point detector.

7. (original) The method of claim 1 wherein:

the detector is a one dimensional detector.

8. (original) The method of claim 1 wherein:

the detector is a two dimensional detector.

9. (original) The method of claim 1 wherein:

the detector is a photovoltaic detector.

10. (original) The method of claim 1 wherein:

the detector is a photoconducting detector.

11. (original) The method as in claim 1 wherein:

the detector is a bolometric detector.

12. (original) A Fourier transform spectrometer comprising:

an interferometer;

a reference electromagnetic radiation source;

an infrared radiation source;

a detector that provides an output signal from the reference and infrared sources that exhibits a non-linear variation;

a preamplifier circuit, responsive to the output signal, producing an output signal;

an amplifier circuit, responsive to the preamplified signal, producing an output signal;

means for digitizing the amplified output signal to provide a measured interferogram;

signal processing means for acquiring interferogram data wherein the measured interferogram is represented as a measured spectrum $S_m = a_1 S + a_2(S*S) + a_3(S*S*S) + b_3 (S*S*S*S) + \ldots$ wherein S is the spectrum of the linear interferogram and * indicates convolution, a linear interferogram I is expressed as a power series of a measured interferogram I_m as in $I = b_1 I_m + b_2 I_m^2 + b_3 I_m^3 + \ldots$, the linear spectrum is expressed as a power series of the spectra of the interferogram powers $S = b_1 S_1 + b_2 S_2 + b_3 S_3 + \ldots$, and the coefficients b_i are computed where $S = 0$.

13. (currently amended) A Fourier transform spectrometer as in claim 12 wherein:

the signal processing means selects a set of m measurements from 1 to n + 1 from the spectra of the powers of the measured interferogram where $S = 0$; and

<u>makes</u> [maks] $b_1 = 1$ and $m = n$.

14. (original) A Fourier transform spectrometer as in claim 12 wherein:

the signal processing means selects a set of m measurements from the spectra of the powers of the measured interferogram from 1 to n + 1 where $S = 0$; and

makes $m > n$; and

uses the least square approximation to find b_i.

15. (original) A Fourier transform spectrometer as in claim 12 wherein:

the signal processing means uses for each measurement of the measured spectra the average of 2 or more resolution elements in the spectra of the powers of the measured interferogram to compute b_i.

16. (original) A Fourier transform spectrometer as in claim 12 wherein:
the amplifier uses an AC signal channel.

17. (original) A Fourier transform spectrometer as in claim 16 wherein:
a DC offset is taken from the measured interferogram collected by a DC coupled amplifier.

18. [19.] (currently amended) A Fourier transform spectrometer as in claim 12 wherein:
the detector is a single point detector.

19. (original) A Fourier transform spectrometer as in claim 12 wherein:
the detector is a one dimensional detector.

20. (original) A Fourier transform spectrometer as in claim 12 wherein:
the detector is a two dimensional detector.

21. (original) A Fourier transform spectrometer as in claim 12 wherein:
the detector is a photovoltaic detector.

22. (original) A Fourier transform spectrometer as in claim 12 wherein:
the detector is a photoconducting detector.

23. (original) A Fourier transform spectrometer as in claim 12 wherein:
the detector is a bolometric detector.